CREDIT/CALLING CARD PAY TELEPHONE METHOD AND SYSTEM EMPLOYING TELEPHONE UNIT LOCAL CARD-CHECKING AND OTHER INTELLIGENCE COOPERATIVE WITH LOCAL PERSONAL HOST COMPUTER

The present invention relates to so-called "pay telephone" systems and methods, being particularly concerned with credit/calling card utilization therewith.

Conventional calling card telephone systems involve simple telephones and call-processing centers. Typically, the center is an expensive, large, centralized telecommunications/computer facility. Regardless of the number dialed by the customer, the telephone automatically rings the remote processing center, either through a leased line or by dialing an inbound WATTS line. After connecting with the center, the telephone unit transmits the number the customer originally dialed and, upon receipt of that number, the center prompts for the customer's credit/calling card number, generally by sending a "bong" tone. After receiving the credit card number, the center validates the card number as legitimate and processes the call by accessing an outside line and dialing the customer's number. To determine call duration, the center monitors the line until the customer terminates the call. The center's computer then generates billing information based upon time of call initiation, duration, number dialed, and calling card number/customer identification. Systems of such and related character are described, for example, in U.S. Pat. Nos. 3,723,655; 3,727,186; and 3,982,103.

While it has also been proposed, as disclosed, for example, in U.S. Pat. No. 4,731,818, to store call information data at the telephone pay station including the credit card identification, the called number and the time, date and duration of the call, and then to transmit or down-load the stored data periodically at off times to a remote central billing computer upon request by such central billing computer, current pay telephone-credit card systems rely upon the above-discussed remote call-processing centers for credit/calling card validation, call particulars and duration tracking, and billing information generation. A local memory card reader for other uses is disclosed also in U.S. Pat. No. 3,696,335.

In accordance with the present invention, as contrasted from such conventional systems employing remote centralized and distributed intelligence, most of the necessary intelligence is shifted to the local telephone unit itself and requires only a local IBM-PC or similar class computer for a host and for billing generation. Among the purposes of the invention, thus, is to reduce substantially the cost of operating conventional credit/calling card telephone networks, with such cost savings being even more substantial in specialized applications such as in cellular pay telephone systems.

The method and system of the invention, moreover, provide virtually instantaneous call processing. After entering the number to be dialed, the customer is prompted to enter the calling card or credit card number, with the local unit determining the card's validity by checking its own self-contained database. If valid, the unit locally stores this information and immediately processes the call by out-dialing on any standard subscriber telephone line. Monitoring the line until terminated by the customer, the unit then locally stores card number, number dialed, date, time and duration as a "transaction record" into its non-volatile memory. After a programmable number of calls, or period of time, or a combination of both, the unit itself automatically dials a local host computer with its own internal modem. Upon connection and after identifying itself with the telephone line number, the local telephone unit begins transmitting its transaction records in batches. Each record is sent with a Longitudinal Redundancy Check (LRC) code to guaranty error-free transmission of record data. Any interference results in automatic re-transmission until the transaction is error-free, with this entire transfer time occurring in seconds.

The local host PC, having received all the pertinent data concerning individual call detail records, then locally generates billing information, with charges calculated by comparing the individual unit telephone number with the charges or rates associated from that LATA (Local Area Transport Area) which are contained in the local PC database.

A further advantage of this technique resides in the facile provision of sophisticated remote maintenance functions. If a telephone unit equipped in accordance with the present invention has not reported transactions within a certain preset timeframe, for example, the PC will identify the potentially malfunctioning unit. Further, software and database updates can be made remotely to the telephone units, thereby eliminating maintenance visits by service personnel.

A most significant difference between the local intelligence telephone-PC host system of the invention and conventional systems is that no verification call is required; the telephone unit, for example, making but one 30-second call per day for reporting, whereas conventional systems require a call for every transaction. As before stated, the telephone unit itself may initiate such reporting and the final billing may be generated at the local PC. The cost of setting up the telephone network of the invention, furthermore, involves only an IBM-PC class host computer, for example, appropriate software and one intelligent telephone unit. Conventional systems, on the other hand, require hundreds of calling card telephones to be deployed in order to justify the cost of a major telecommunications/computer facility. Due to the significantly reduced operational costs of the system of the invention, moreover, relative profit margins can be increased to the owners and/or cost decreased to the customer.

Thus conventional pay telephone-credit card systems require mini-computers, major PBX facilities, fixed leased line/WATTS charges and relatively long connection times. The invention, in contrast, is micro-computer based, requires no PBX, uses standard subscriber lines, and provides fast connection times; the system of the invention being admirably applicable as a direct replacement for all conventional systems. It is, furthermore, particularly valuable in situations wherein dedicated leased lines are not feasible or are impossible, as in temporary installations. When equipped with a cellular radio-telephone interface, the system of the invention is capable of operation in such temporary installations, and in mobile settings as in, for example, trains, rental cars, taxi cabs, limousines and ferries.

Due to the on-board intelligence provided with the technique of the invention, many special features and functions may be provided that are beyond the limitations of standard telephones, including direct access to emergency numbers and to operator assistance; use with magnetic strip reading; programmable billing parameters; customized forms generation; specialized calling